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Transthoracic versus Transhiatal Esophagectomy: A Permanent Dilemma. Our 15-year Experience

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Rezumat

Esofagectomia transtoracică versus transhiatală: o permanentă dilemă. Experienţa noastră

Obiectiv: Abordul chirurgical al cancerului esofagian toracic rămâne controversat. Analizăm retrospectiv şi comparativ esofagectomiile transtoracice şi transhiatale efectuate în serviciul nostru.
Pacienţi şi metodă: În perioada 1997-2011, am identificat 100 de pacienţi la care s-au efectuat esofagectomii transtoracice sau transhiatale pentru carcinoame scuamoase esofagiene (90 de cazuri) sau adenocarcinoame (10 cazuri). Am urmărit date demografice şi operatorii, morbiditatea, mortalitatea şi supravieţuirea la 1-3 ani.
Rezultate: Abordul transtoracic a fost preferat pentru tumori semnificativ mai mari, localizate în treimea superioară şi medie a esofagului, la pacienţi mai tineri cu mai puţine tare cardiopulmonare asociate. Pierderile sanguine au fost semnificativ mai mari după esofagectomiile transtoracice (p=0,0004) iar aceste operaţii au durat semnificativ mai mult decât esofagectomiile transhiatale (p=0,02). Am identificat complicaţii postoperatorii la 70,7% dintre pacienţii cu esofagectomie transtoracică, respectiv 59,3% dintre pacienţii cu esofagectomie transhiatală. Mortalitatea la 30 de zile după esofagectomie transtoracică a fost 12,2% şi respectiv 10,1% după abordul abdomino-cervical. Supravieţuirea la 1 an a fost 62,2%, la 2 ani - 39,3%, iar la 3 ani -15,1%.
Concluzii: Ambele aborduri chirurgicale sunt fezabile, cu rezultate comparabile, alegerea unei anumite tehnici fiind o chestiune ce ţine de selecţia pacientului dar şi de preferinţa chirurgului operator.

Cuvinte cheie: esofagectomie transtoracică, esofagectomie transhiatală, morbiditate, mortalitate, supravieţuire

Abstract

Objective: Controversy still exists regarding the optimal surgical management of esophageal cancer. This study was performed to determine and compare early and late morbidity, mortality and overall survival after transthoracic (TTE) and transhiatal esophagectomies (THE).
Methods: Between 1997-2011, 100 patients underwent TTE or THE for squamous esophageal carcinoma (90 patients) and adenocarcinoma (10 patients). Assessed parameters included patient demographics, operative data, pathology results, postoperative morbidity and mortality and 1-3 year survival.
Results: Thoracic approach was preferred in cases of more advanced tumors, located in the upper and mid-third of the esophagus, in patients with a better cardiopulmonary status.

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Perioperative blood loss was significantly higher after transthoracic resections (p=0.0004) and these surgeries took significantly longer than transhiatal esophagectomies (p=0.02). We identified complications in 70.7% patients who underwent TTE and in 59.3% patients with transhiatal approach. Respiratory complications were statistically significant in the TTE- group (p-0.0003). The 30-day mortality rates were 12.2% for patients in TTE group and 10.1% in THE patients group, respectively. The mortality rate for the entire period of the study has been calculated at 84.4%. We have identified a survival rate after 1 year of 62.2%, after 2 years of 39.3% and after 3 years – 15.1%.
Conclusions: According to the results of this study, both procedures appear to be acceptable depending on surgeon preference and appropriate patient selection.

Key words: transthoracic esophagectomy, transhiatal esophagectomy, morbidity, mortality, survival

Introduction

Esophageal cancer, with its two main histopathological subtypes - squamous cell carcinoma (SCC) and adenocarcinoma (AK) - is the eight most common cancer worldwide, having a wide variation in its frequency between high- and low-incidence regions (1). In our geographical area it appears to be less frequent but it has a high case fatality ratio and a high gender ratio (2).

Despite improvements in oncology therapies and the increasing acceptance of multimodality treatment which both seem to enhance survival rates, surgery remains the main treatment for resectable esophageal cancer (1,3). Among the surgical approaches described for esophagectomy, right transthoracic technique (Ivor Lewis procedure) with its three-stage variant (McKeown procedure) and transhiatal approach (Orringer procedure) remain the most commonly used. Over the last decades, there has been considerable controversy as to which of these approaches provides better short- and long-term outcomes, most of the conclusions being contradictory (4).

The aim of this study was to compare the results obtained after transthoracic and transhiatal esophagectomies performed in our Surgical Department between January 1997 and December 2011.

Material and Method

This retrospective analysis represents a follow-up of a previously published study conducted in our department regarding the general topic of esophageal reconstructions (5). In the present study we have analyzed the clinical observation sheets, operatory and anatomopathological protocols and we have initially included in our database the results of all esophageal reconstructions performed during 1997-2011 in the Second Department of Surgery, Emergency Mures County Hospital, Romania. In the studied period, a number of 181 esophageal reconstructions were performed on a number of 178 patients, diagnosed with heterogeneous diseases of the esophagus, the majority of cases including esophageal cancers and post-caustic stenosis.

We have included patients diagnosed with thoracic esophageal cancer (squamous cell carcinomas, adenocarcinomas), without metastatic disease or clear signs of unresectable tumors, for whom a transthoracic (TTE) or transhiatal esophagectomy (THE) has been performed. We excluded from the study, based on the diagnosis, those patients which presented post-caustic stenosis (23 cases) and based on the surgical procedure type, the patients with inoperable esophageal cancer for whom an esophageal bypass operation was performed as a palliative surgical method (26 patients). Furthermore, in the scope of the groups' homogeneity, we excluded patients with gastroesophageal junction adenocarcinomas (22 cases) or esophageal cancers (7 cases), for whom the resection type and approach was different than the studied one (abdominal and/or left transthoracic approaches, thoraco-phreno-laparotomies).

After exclusions, 100 patients remained eligible for our investigation (56.17 %). The majority of them presented squamous esophageal carcinoma (90 patients), whereas the others presented an adenocarcinoma (10 patients). The esophageal resections performed on these patients consisted of transthoracic and transhiatal esophagectomies, respectively.

The positive diagnosis was based on barium esophagography and endoscopy. Despite in some cases offering pathognomonic images, the radiologic examination was gradually replaced by endoscopy, which provides a direct image, allowing for a biopsy and histopathologic examination. The tumor's extension was assessed by computer tomography imaging; unfortunately, we have not benefited from the use of an endoscopic ultrasonography. Other examinations utilized for the preoperative diagnostic work-up or risk-assessment were laboratory tests, abdominal echography, electrocardiogram with cardiologic evaluation, functional respiratory tests, chest radiography and sometimes bronchoscopy. All patients have signed an informed written consent form.

Surgical procedure

The right posterolateral thoracotomy was the first step of the transthoracic procedure, with the esophagus being resected along with azygos vein, overlying pleura and surrounding periesophageal lymph node-bearing mediastinal tissue. Laparotomy was the next operatory step. The gastric tube has been fashioned by resecting the lesser curvature of the stomach, a drainage piloromiotomy was constantly done and the perigastric lymphadenectomy was performed. Usually the esophageal substitute was advanced ortotopically to the cervical level; in the presence of a macroscopically visible tumoral residue we used the retrosternal route. In rare situations we performed coloesophagoplasties, especially when the stomach was found improper for esophagoplasty. The cervical part of the procedure consisted of a left cervicotomy,

the dissection and resection of the cervical esophagus without cervical lymph node dissection; finally an end-to-side single layer hand sewn esophagogastric anastomosis was fashioned in the neck.

During the transhiatal esophagectomy, the median laparotomy was the first operatory step, as this also had the aim to confirm the operability. The inferior mediastinal esophagus was bluntly dissected under direct vision, through the enlargement of the esophageal hiatus, sometimes using a bimanual approach through laparotomy and left cervicotomy. The gastric tube was the preferred esophageal substitute which was advanced in most cases ortotopically to the cervical level. The cervical step was similar to the one described for the transthoracic esophagectomy. Opening of the pleural cavities, either accidental or intentional, imposed pleural drainage.

In the last period we have consistently used the an alimentation jejunostomy.

Follow-up

The patients were initially monitored in the intensive care unit (ICU) until extubation, and they were stable and well enough to be managed on the surgical ward. We have noted the immediate postoperative evolution, the necessity of prolonged ventilation support, number of days spent in the ICU and in the hospital and early postoperative complications. The 30-day mortality rate was also noted.

After discharge, patients were routinely followed-up by the surgeons at 3-6 month intervals. The patients initially included in the study were followed-up until they were lost to follow-up, the end of the study or death; the median follow-up period was 1.3 years (478 days) with a range of 12 days to 3.37 years.

Statistical analysis

The statistical analysis was performed using MedCalc Software (bvba Version 12.3.0, Mariakerke, Belgium). A Student test has been applied in order to evaluate the differences between continuous variables' means (expressed through mean ± SD), while the chi-squared (χ^2) was utilised for categorised variables (expressed through nr %). The differences in non-parametric variables (expressed through median and range) were compared using the Mann-Whitney U test. The survival analysis was performed using the Kaplan Meyer method, with the log-rank test being utilised for univariate comparisons.

All the tests were interpreted at the $p=0.05$ significance threshold, and statistical significance has been considered for all values of p lower than the threshold.

Results

The general lot of esophageal reconstructions was divided in two sub-groups: group 1 – containing transthoracic esophagectomies (TTE) - 41 patients (41 %) – and group 2 – transhiatal esophagectomies (THE) - 59 patients (59 %).

Types of interventions

All patients (41) who underwent a TTE presented a squamous cell carcinoma (SCC) of the upper-or mid-third esophagus. Reconstructions consisted of ortotopic gastric pull-up in the majority of cases (34 cases); the retrosternal route was rarely used (2 cases) and colon interposition was performed in 5 cases (4 cases of ileo-colo-esophagoplasties and 1 case of isoperistaltic left colon esophagoplasty). The THE was performed in 59 patients, with 49 patients presenting a SCC and 10 patients with adenocarcinoma of the esophagus, respectively. Here reconstructions consisted of ortotopic gastric pull-up procedures in 55 cases; ileo-colo-esphagoplasty was performed in 3 cases and a left colon esophagoplasty was done in one case.

Patients' characteristics

We have noticed the predominance of esophageal cancer for males, with a male to female ratio of 9:1 and a mean age of 58.1 (37-81 years). We have not observed significant differences regarding the affection of certain age groups, but we do note a slightly younger TTE - group of patients, with ages between 61 and 70-years old, and a higher proportion of patients over 70-years old in the second group, consecutively with more frequently associated cardiopulmonary diseases.

Significant differences between the groups were revealed when the type of surgery was analysed taking the tumors location into consideration (p-0.005). We have chosen TTE for tumors located in the upper-third of the esophagus and for the majority of those located in the mid-third. Transhiatal esophagectomies were performed in the case of tumors located from the mid-third towards the lower-third of the esophagus. We have also obtained a statistical significance (p-0.0001) through the analysis of the tumor's size, with a mean of extension in length higher in the TTE-group than the one observed for Group 2. The tumor grading was similar for the two lots. Perioperative blood loss was significantly higher after transthoracic resections ($p=0.0004$), which was also significantly less long than THE ($p=0.02$). We have not identified statistically significant differences in the total number of days spent in the hospital (p-0.19), nor for the number of days spent in the ICU (p-0.75).

In terms of pT-category, we observed that the majority of esophagectomies were performed for advanced tumors. In both groups, there were 57 interventions (57 %) performed for tumors which invaded the adventitia (T3), and 20 (20 %) for tumors, although resectable, which invaded adjacent structures (pleura, pericardium, diaphragm) (T4a). Among the patients who underwent a TTE, in 31.8 % of the cases the infiltration of the tumor beyond the esophagus (T4a) was observed, whereas the majority of patients (27.1 + 59.3 %) from THE-group were found in less advanced stages (T2 or T3), with the tumor confined to the organ.

A similar situation was encountered in the case of pN-category, where 39 % of patients in Group 1 were in N2 and 25.4 % of those in Group 2 were found in N0.

Table 1. *Demographic and clinicopathological characteristics of the study subjects*

Characteristic	Categories	TTE-group of patients 41 (41.0 %)	THE-group of patients 59 (59.0 %)	P value
Sex	male/female	39 (95.1)/2 (4.9)	51 (86.5)/8 (13.5)	0.27
n (%)				
Mean age±SD	(years)	58.1±8.5	58.1±9.1	0.98
	31-40	1 (2.4)	0 (0.0)	
	41-50	7 (17.1)	12 (20.3)	
Age groups	51-60	14 (34.2)	22 (37.3)	0.43
n (%)	61-70	18 (43.9)	19 (32.2)	
	71-80	1 (2.4)	4 (6.7)	
	>80	0 (0.0)	2 (3.4)	
Level of tumor	upper-third	8 (19.5)	6 (10.2)	0.005
n (%)	mid-third	29 (70.7)	30 (50.8)	
	lower-third	4 (9.8)	23 (39.0)	
Tumor size	length	49.5±13.1	35.4±13.9	0.0001
mm±SD	Depth	19.6±8.4	19.8±8.8	0.89
	G1	2 (4.8)	10 (17.0)	0.18
Tumor grading	G2	30 (73.2)	37 (62.7)	
n (%)	G3	9 (22.0)	12 (20.3)	
Blood loss				
Mean±SD	ml	950±475	650±350	0.0004
Duration of surgery	min	310 (220-480)	220 (170-330)	0.02
Median (range)				
In-hospital stay	days	18 (7-45)	17 (4-31)	0.19
Median (range)				
ICU-stay	days	8 (2-32)	8 (2-22)	0.75
Median (range)				
pT-category	T1	0 (0.0)	1 (1.7)	0.06
n(%)	T2	6 (14.6)	16 (27.1)	
	T3	22 (53.6)	35 (59.3)	
	T4	13 (31.8)	7 (11.8)	
pN-category	N0	7 (17.1)	15 (25.4)	0.08
n(%)	N1	18 (43.9)	31 (52.5)	
	N2	16 (39.0)	13 (22.1)	

Lymph node status

The total number of removed lymph nodes in both groups was 1236, 795 (64.3%) in patients who underwent TTE and 441 (35.6%) in patients with transhiatal approach, respectively. (*Table 2*) We found 125 (15.7%) metastatic nodes in the first group and 103 (23.3%) in the second one. The median number of retrieved nodes per patient was 19 (range: 11-29) in the transthoracic group and 7 (range: 5-18) in the transhiatal group, respectively (Mann Whitney test: p- 0.0001). As regarding the number of metastatic nodes according to T-categories, we did not find metastatic nodes in T1-category patients but in T4-category patients 29.3% nodes out of the total were involved, all patients being found with metastatic regional nodes.

Postoperative complications

We identified complications in 70.7% patients who underwent TTE and in 59.3% patients with transhiatal approach. Postoperative morbidity is detailed in *Table 3*. Respiratory complications were statistically significant in the first group (p-0.0003) being represented by 11 pleuresies, 5 atelectases, 7 cases of pneumonia. We also frequently encountered cervical anastomotic leaks, more in THE group, but still not statistically significant. The 30-day mortality rates were 12.2% for patients in the TTE group and 10.1% in THE patients group, respectively; the deaths were caused by total or partial esophageal conduit necrosis (6), pulmonary embolism (1), cardiovascular events (2), massive postoperative bleeding (1) and anastomotic leak (1).

Late complications were represented by anastomotic stenoses and recurrences. We noted 12 cervical anastomotic stenoses the majority of them being conservatively treated with dilations; in 4 cases we performed a surgical plasty of the anastomosis. We encountered locoregional and/or systemic recurrences in 46 cases, which all represented the cause of death during follow-up.

Table 2. *Lymph node status in TTE-group and THE-group, respectively; overall and according to pT-category*

			TTE-group of patients 41 (41.0 %)			THE-group of patients 59 (59.0 %)		
Removed nodes, Total No.			795			441		
Involved nodes Total No.			125			103		
Number of nodes removed per patient Median*, range			19 (11-29)			7 (5-18)		
pT-category	T1 (n=0)	T2 (n=6)	T3 (n=22)	T4 (n=13)	T1 (n=1)	T2 (n=16)	T3 (n=35)	T4 (n=7)
Number of patients with metastatic nodes according to pT-category	0/0 -	2/6 33.3 %	19/22 86.4 %	13/13 100 %	0/1 -	8/16 50 %	29/35 82.8 %	7/7 100 %
Number of metastatic nodes according to pT-category - from total nodes	0/0 -	4/117 3.4 %	48/442 11.4 %	73/256 28.5 %	0/8 -	11/116 9.5 %	60/249 24.1 %	22/68 32.4 %

*-p-0.001. test Mann Whitney

Table 3. *Postoperative complications*

Complications	TTE-group of patients 41 (41.0%)	THE-group of patients 59 (59.0%)	P value
Without complications	12 (29.3)	24 (40.7)	0.34
Pulmonary	23 (56.1)	15 (25.4)	0.003
Pulmonary embolism	0 (0.0)	1 (1.7), (1)*	-
Cardiac	2 (4.8)	4 (6.7), (2)*	0.9
Haemorrhage	1 (1)*	1	-
Wound infection	3 (7.3)	2 (3.4)	0.67
Anastomotic leakage	9 (21.9)	15 (25.4), (1)*	0.86
Conduit necrosis-sepsis	4 (9.7), (4)*	2 (3.4), (2)*	0.4
Bowel obstruction	1	0	-

()* hospital mortality (30-day mortality)

Survival

In the interval 1-3 years following the moment of the surgical intervention, we have lost 10 patients from our evidence. The mortality rate for the patients monitored during the entire period of the study has been calculated at 84.4%. We have identified a survival rate after 1 year of 62.2%, after 2 years of 39.3% and after 3 years – 15.1%. Depending on the type of esophagectomy, we have noticed an improved survival rate in the first and second year after the TTE. The median of the survival rate for TTE has been estimated at 23 months, whereas for the THE was calculated at 16 months (*Fig. 1*). The log-rank test analysis of the survival has revealed statistical significances in the case of age groups (p-0.002), but mostly in the case of the pT (p-0.004, *Fig. 2*) and pN-categories (p-0.006, *Fig. 3*). *Table 4* contains the entire range of descriptions related to the patients' survival, taking different variables into consideration.

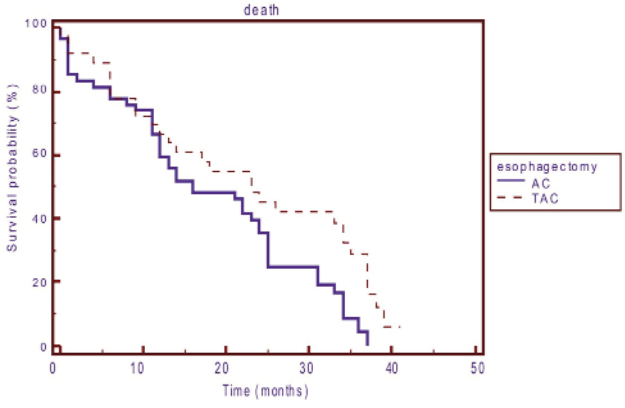

Figure 1. *Overall survival after transthoracic and/vs transhiatal esophagectomies*

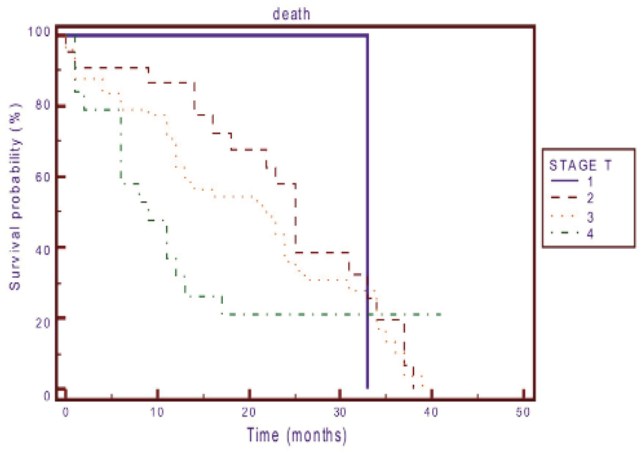

Figure 2. *Survival according to pT-category*

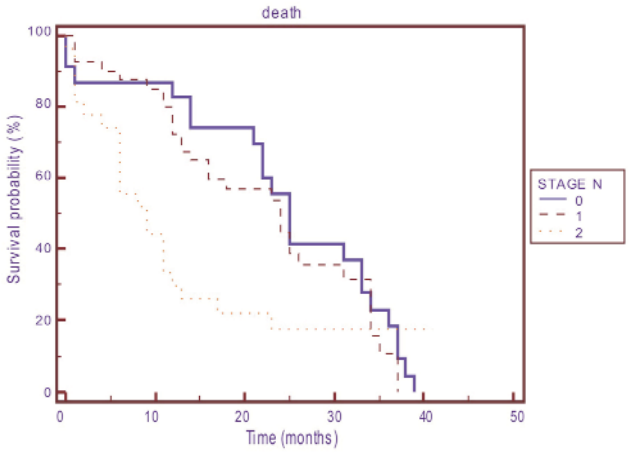

Figure 3. *Survival according to pN-category*

Table 4. *Survival rates of investigated patients*

Characteristics	Categories (number)	Deaths n (%)	Survival at 1 year (%)	Survival at 2 years (%)	P value Log-rank
Esophagectomy	TTE (36)	29 (80.5)	66.7	45.0	0.26
	THE(54)	47 (87.1)	59.6	35.5	
Sex	Male (80)	72 (83.7)	61.3	39.5	0.49
	Female (10)	9 (90.0)	59.8	29.1	
	31-40 (1)	1 (100)	-	-	
	41-50 (18)	16 (88.8)	61.1	27.8	
Age groups	51-60 (33)	26 (78.8)	63.6	45.8	0.002
	61-70 (31)	26 (83.8)	67.7	-	
	71-80 (5)	5 (100.0)	-	-	
	> 80 (2)	2 (100)	-	-	
Tumor localization	Upper(12)	11 (91.6)	42.3	34.5	0.65
	Mid-third(51)	43 (84.3)	55.6	40.9	
	Lower (27)	22 (81.5)	66.7	42.8	
	G1 (12)	10 (83.3)	75.0	38.1	0.48
Tumor grading	G2 (58)	48 (82.7)	63.8	41.4	
	G3 (20)	18 (90.0)	47.3	29.6	
	T1 (1)	1 (100.0)	-	-	0.004
pT-category	T2 (18)	15 (83.3)	79.2	41.4	
	T3 (52)	45 (86.5)	62.5	36.0	
	T4 (19)	15 (78.9)	31.6	10.5	
pN-category	N0 (19)	18 (94.7)	82.6	45.4	0.006
	N1 (44)	36 (81.8)	72.5	44.7	
	N2 (27)	22 (81.5)	29.6	9.0	

Discussions

This study was performed with the intent to compare transthoracic and transhiatal esophagectomy as regarding early postoperative outcome, morbidity, mortality and overall survival, starting from our 15-year experience.

The vast majority of esophageal cancers are represented by squamous cell carcinomas (SCC) and adenocarcinomas (AK). The disease is less frequent in our geographical area; in Romania, the incidence is low, however the evolution is characterized by a very high case fatality (males/females: 0.96/1) and a high gender ratio (males/females: 5.8/1), with the majority of malignant esophageal tumors still represented by SCC. (2)

Surgery remains the main stay of treatment for curable esophageal cancer. (4). The right transthoracic esophagectomy, also known as Ivor Lewis operation and its variations, here including three field esophagectomy (Mc Keown procedure), has for long been considered the gold standard of surgical treatment for thoracic esophageal carcinoma. (6,7) It was thought that complying with the general principles of oncologic surgery i.e. good exposure, dissection at a distance

from the tumor, extended lymphadenectomy – brings upon the advantage of a better surgical control of the disease with more R0 resections and an improved survival rate. (9-11) Unfortunately, it has been proven that the surgical resection of the esophagus is rarely curative and, in most cases, it is palliative, with only 0-17% R0 resections in T3-T4 cases. (9-11) Starting from this point and aiming to diminish the postoperative pulmonary morbidity after thoracotomy, Orringer popularized transhiatal esophagectomy 35 years ago, describing comparable survival rates with transthoracic approach. (12-15) Since then the question of one approach being superior to the other has continuously been a source of considerable controversy among surgeons.

Several attempts have been made to determine whether the extension of the esophageal resection and lymphadenectomy can improve the survival rate. Three randomized controlled trials (RCT) performed between 1990 and 2000, did not show significant differences in postoperative morbidity, in-hospital mortality and reported overall survival between the two esophagectomy techniques. (16-18) A meta-analysis undertaken in 2001 by Hulscher et al (19) and followed by a RCT in 2002 (20) has provided level I evidence regarding this controversial issue, showing the superiority of transhiatal approach in terms of operative duration, blood loss, perioperative morbidity rate, hospital and ICU stay, but with the rest of complications being similar and with no difference in 5-year overall survival between the two approaches.

In our study we have not identified any significant differences between the groups as regarding demographic data, clinical characteristics or tumor grading; however we have found that in the case of the tumor's location, TTE was preferred for tumors of the superior and median esophagus, for a slightly younger group of patients, with a better preoperative cardiopulmonary status. Although the majority of patients in both groups (77%) were operated on in advanced stages, TTE-group included patients with significantly bigger tumors, with the esophageal cancer reaching the adventitia or exceeding the organ and presenting lymph node metastases.

The quality of lymph node dissection might also influence survival, the majority of loco-regional recurrences being in fact lymph node metastases. (21) A minimum number of dissected lymph nodes is needed for accurately defining the pN-category in patients with esophageal cancer undergoing formal two field thoraco-abdominal lymph node dissection (LND). (22,23) It appears that more extended lymph node dissection to cervical level brings only a benefit of some significantly lower cervical recurrences, but does not result in any survival rate improvement, especially in advanced stages of the disease. (21-23)

We cannot state that we have performed an extensive LA; in the cases operated through thoracotomy, a two- field LND was performed, with a median number of retrieved nodes per patient of 19, which of course is superior than the one obtained in the second group but in the view of most studies could be considered suboptimal.

Our complication and 30-days mortality rates are situated towards the superior limit of the ones cited in the literature. (16-20) We have identified significantly more respiratory complications in the group operated through thoracotomy and regarding the cervical anastomosis fistula, they were more numerous in the THE group but still without statistical significance. The majority of these fistulas were conservatively managed and have not significantly contributed to the in-hospital mortality even if they were lately followed by an important number of cervical anastomosis stenosis. An opposite effect of partial or total conduit was necrosis, which was followed in all instances by mediastinitis, severe sepsis, and death The incidence of this disastrous esophageal surgery complication is somehow globally reported in the literature. Most studies do not specify the exact nature of the postoperative ischemic complication (true ischemia or fistula) and reported average incidence rates for stomach, colon, and jejunum of 3.2%, 5.1%, and 4.2%, respectively. (24) Other authors (Briel and colleagues) reported even higher overall incidence of ischemic esophageal conduit complication (9.2%) with an incidence of ischemia surprisingly bigger (10.4%) for stomach than for colon (7.4%). (25) Our 9.7% overall incidence of conduit necrosis in TTE group is hard to be explained; two cases were ileo-colo-esophagoplasties which both clearly failed due to conduit ischemic complications. The other two were gastric pull-up procedures complicated with important cervical leaks one week after surgery, followed by sever sepsis and death; even if they were initially interpreted as partial conduit necrosis, it is difficult to assess retrospectively the importance of the ischemic mechanism.

The higher perioperative mortality encountered among the group of patients operated through THE can be explained by the fact that half of the deaths had non-surgical related causes (one embolism, two IMA) in patients generally older than the TTE group and with more important associated cardio-pulmonary diseases.

In the last decades, the survival rates following esophagectomy have significantly improved, mostly due to a decrease in the postoperative mortality and associated multimodal therapy. (26-30)

We have succeeded in monitoring patients included in the study for a period of three years, during which we have lost 10% of the patients from our evidence. The mortality rate for the entire period was 80.4%, with a slightly better survival rate for the TTE-group of patients in the first two postoperative years. We have not used neoadjuvant chemotherapy in our lot; the postoperative oncologic treatment was inconsistent, difficult to follow up and hence this variable was excluded from the analysis. All this taken into consideration and alongside the advanced stage of the disease can explain the survival rates observed by us. Among the factors which influenced the survival – we have noted T and N- category.

The present study retrospectively compared transthoracic and transhiatal esophagectomies. Despite its limitations – it is non-randomized, with small sample size per arm and several group selection biases – we believe that it reflects the reality regarding the clinico-therapeutic particularities of esophageal carcinoma in our geographical area i.e. late diagnosis, generally in advanced stages of the disease, consecutively with low rate

of curative resections and with marked inconsistency in oncological treatments, all of these thereby influencing the prognosis and survival rates.

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Conflict of interests.

None declared.

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